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Fishery Leaflet 302

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KITE RIGS FOR OTTER TRAWL GEAR

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Various types of balloon trawls have been developed for use in the United States Fisheries, but little attention has been given the use of kites in expanding the vertical fishing range of otter trawls. Otter trawls rigged with kites have been a common type of gear in many of the European fisheries for some time, and are used principally in catching herring and mackerel. This modification of otter trawl gear might well be of advantage in our domestic fisheries where there are fish frequently found just off the bottom at a distance where they escape the regular "flat" trawl or even the so called balloon trawl.

The gear as used in the European fisheries is generally rigged in one of three ways, as shown in Figure 2, Single Kite Rig; or Figure 3, Single Kite with Danleno; or Figure 4, Double Kite with Danleno. As may be seen in Figure 2, the method by which the net is connected to the otter boards is by means of wire ropes which are continuations of the headrope and groundrope respectively. No danlenos or ground cable (sweep) are used in this method of attachment of the otter boards to the net. This setup is generally used when the gear is being fished for herring and mackerel only, and groundfish are not being sought.

It is difficult to give specific dimensions on the lengths of the kite-towing wires and the kite-tail wires since there will be small variations in accordance with the particular design of net being used. As an ordinary rule, the length of the kite towing lines can be calculated by taking half the length of the headrope plus the length of the legs, and subtracting the length of the kite-tail lines. As an example, in Figure 2, one half the headrope is 50 feet, add the length of the legs, 30 feet, and subtract 6 feet for the length of the kite tail wires, and the sum equals 74 feet for the kite-towing wire. The towing wires are usually 1-inch, 6 x 12, flexible steel wire. It must be emphasized

that this is only a general rule for measurement of length and that any fisherman can make alterations in the light of his experience in operating the gear.

Figure 3 shows the customary rig embodying the use of ground cables or sweeps of varying lengths. Danlenos are connected to the net by means of legs approximately 10 feet in length. The calculation for determination of the length of the kite wires is the same as mentioned in the rig in Figure 2.

Figure 4 shows the use of the first kite as in Figure 3 with the introduction of a second kite, or upper kite, towed from the otter boards. This method of rigging kites is not as generally used as a single kite rig but is the specialty of the Dutch herring trawling fleet in the North Sea. It is the thought of some fishermen that the upper kite riding a considerable distance above the trawl has a tendency not only to keep the trawl fully opened, but also to frighten the fish downward, sending them toward the bottom where they will be in the path of the trawl.

Kites are made in a variety of sizes, but the one illustrated in Figure 1 is very near standard dimensions. It is reinforced with battens on the back, as shown in the lower part of Figure 1. The main holes for taking the kite arms are reinforced by sheet metal squares both front and back to prevent the lines from pulling through the wood while under heavy strain. These are the 1-inch holes in the four corners of the kite. The arms are most frequently made of $2\frac{1}{2}$-inch circumference manila line, but sometimes they are also made of 1-inch circumference wire rope. A Turk's head knot, as shown in the upper part of Figure 1 secures the kite arms against the forward pull.

The 5/8-inch hole one-third the distance from the forward edge of the kite makes a permanent guide as to the towing point. The arms, after being secured in the four main holes in the corners of the kite, are adjusted to such a length that each of them when folded inward, lines up over the 5/8-inch permanent guide hole. Sometimes the two arms are shackled together over this point. In other cases, the arms open outward and each is connected separately to its towing wire (Figure 5). In this method, each arm is fitted with a 3/8-inch swivel where it is made fast to the towing wire.

A third method, also shown in Figure 5, is the attachment of what is known as a bull's-eye to the front of the kite exactly over the 5/8-inch guide hole. This actually is a sheave or roller through which the towing wire is rove. In this instance, the towing wire is one continuous line and the kite is allowed to find its own angle by running free on the wire. It is claimed that by using this hook-up the kite can more easily adjust itself when the vessel is changing course.

Regardless of the type of hook-up used for the kite arms, four metal floats attached to the forward part of the kite, as shown in Figure 1, help to keep the kite upright and in the proper position when the gear is being set out.

KITE

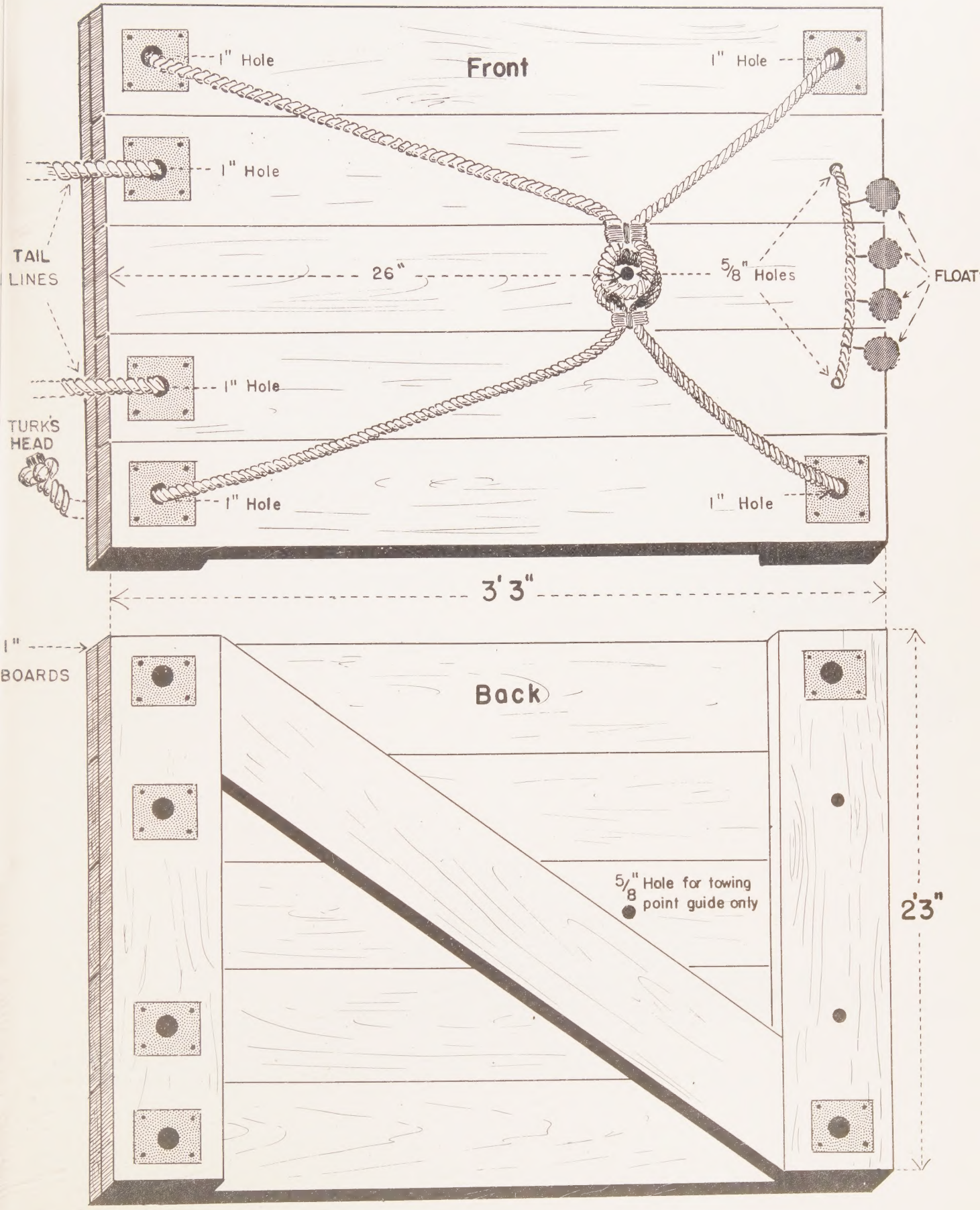

Front
1" Hole
1" Hole
1" Hole
1" Hole
1" Hole
1" Hole
TAIL LINES
26"
5/8" Holes
FLOAT
TURK'S HEAD
3'3"
1" BOARDS
Back
5/8" Hole for towing point guide only
2'3"

FIG. 1

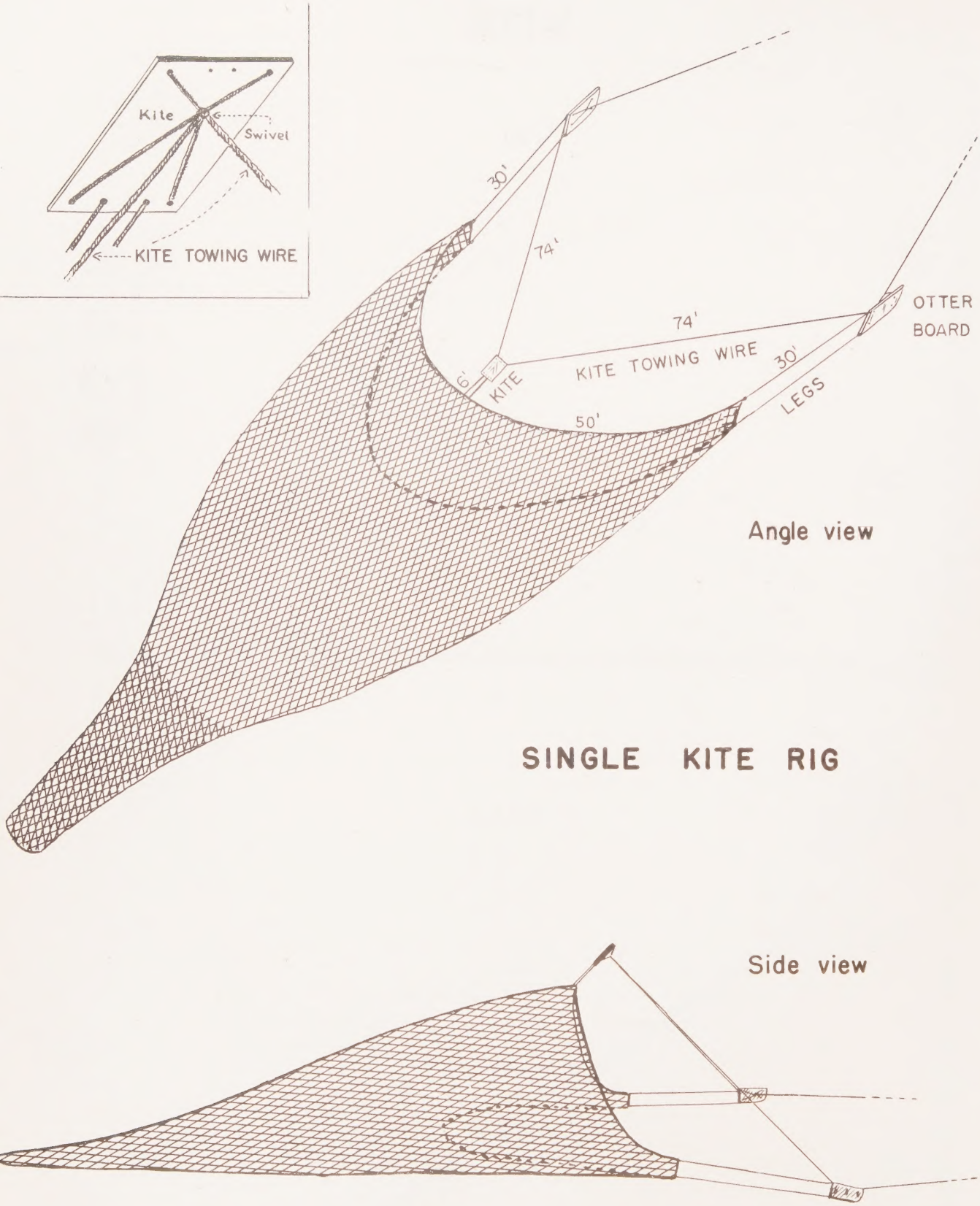
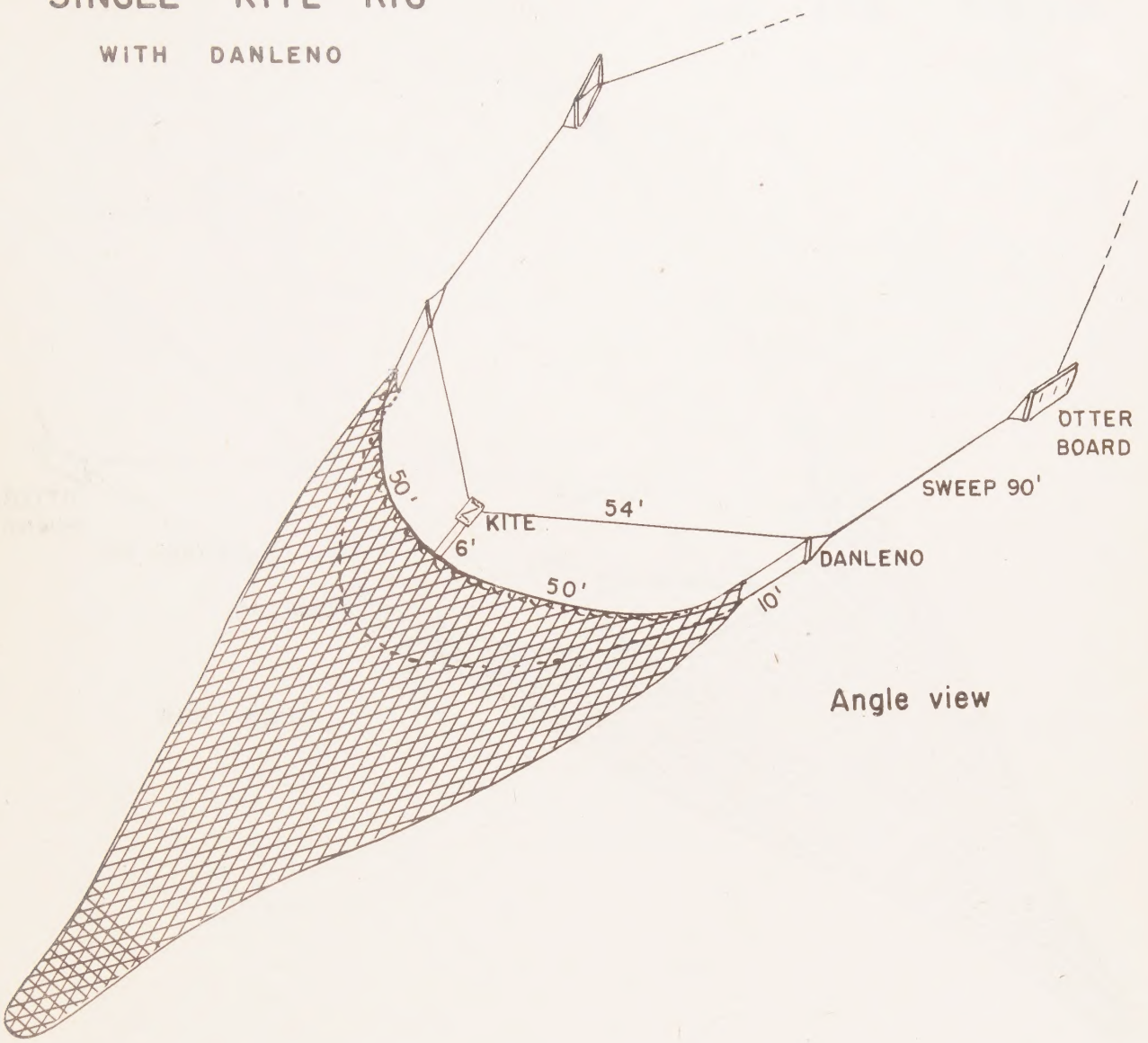

Kite
Swivel
KITE TOWING WIRE
30'
74'
74'
OTTER
BOARD
6'
KITE
KITE TOWING WIRE
30'
LEGS
50'
Angle view
SINGLE KITE RIG
Side view

FIG. 2

SINGLE KITE RIG

WITH DANLENO



Angle view

Side view

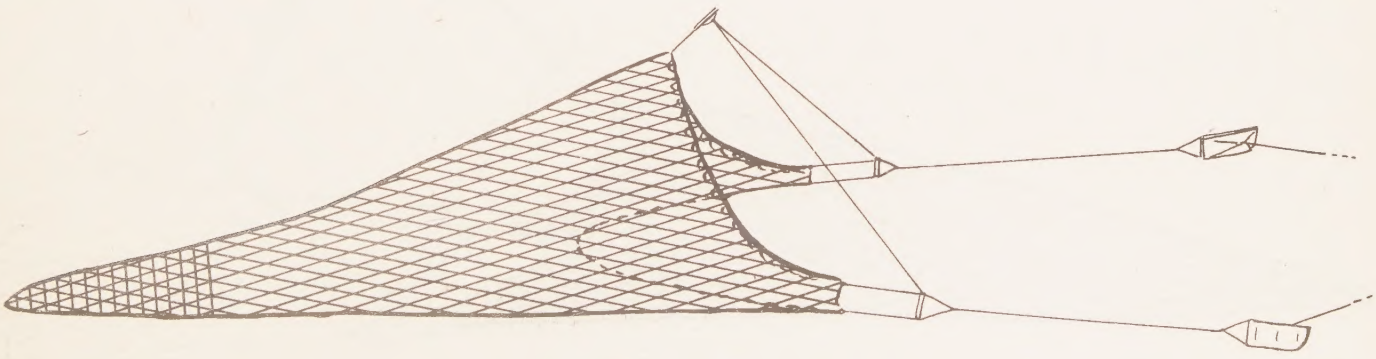
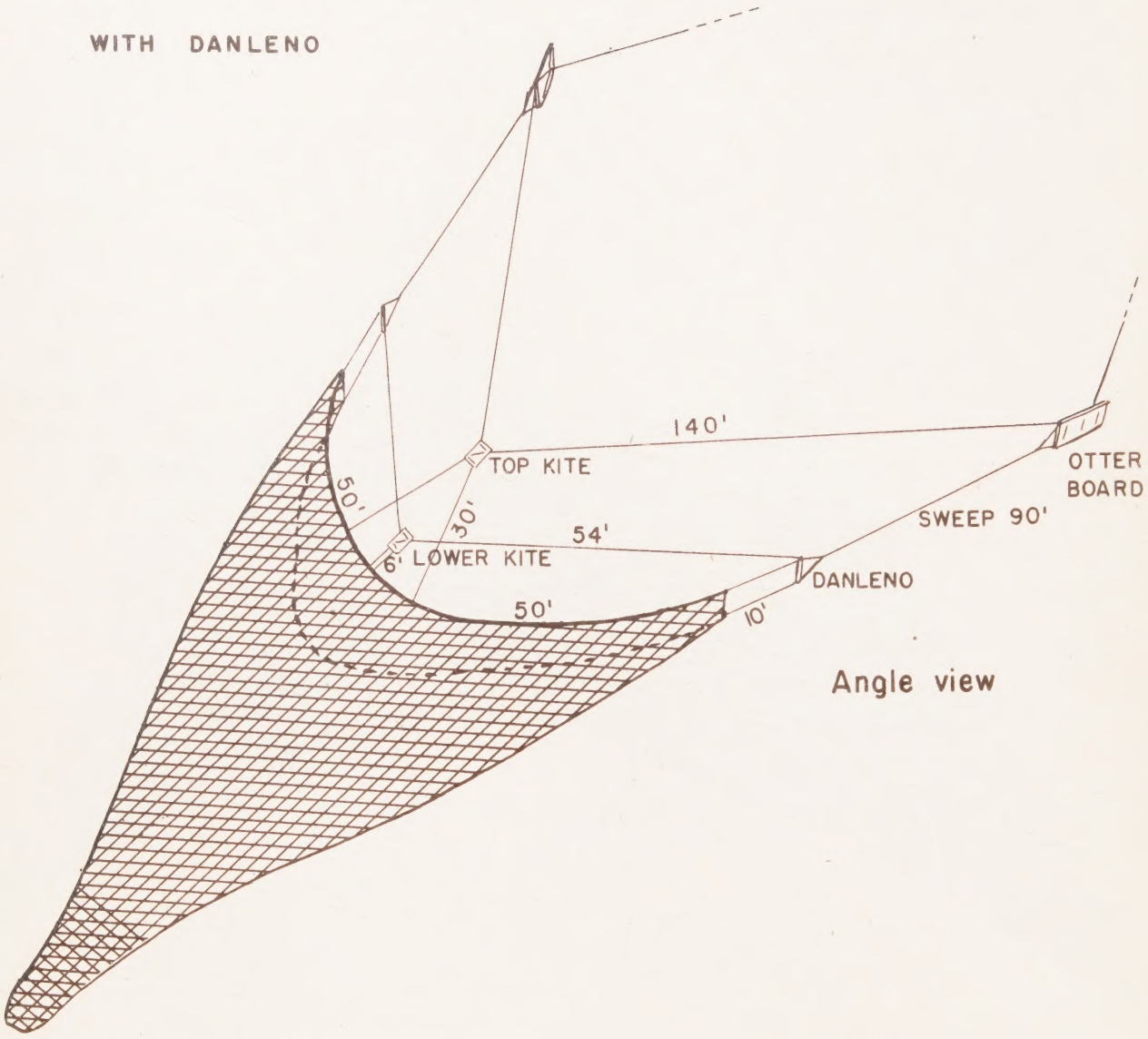


FIG. 3

DOUBLE KITE RIG

WITH DANLENO



Angle view

Side view

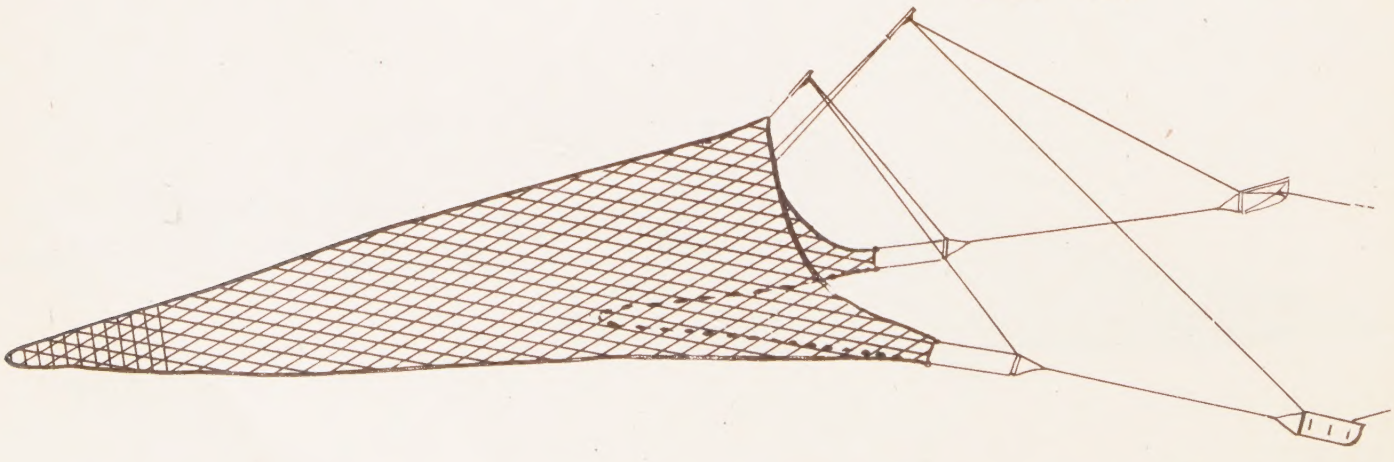
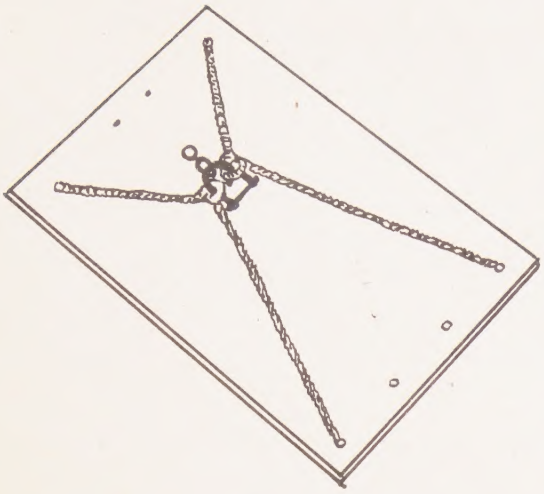
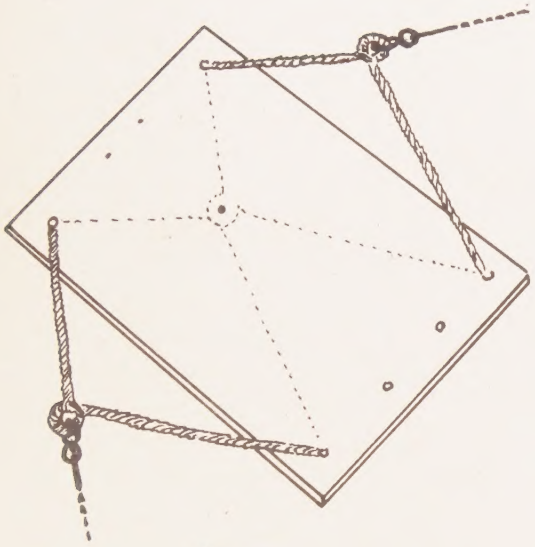


FIG. 4

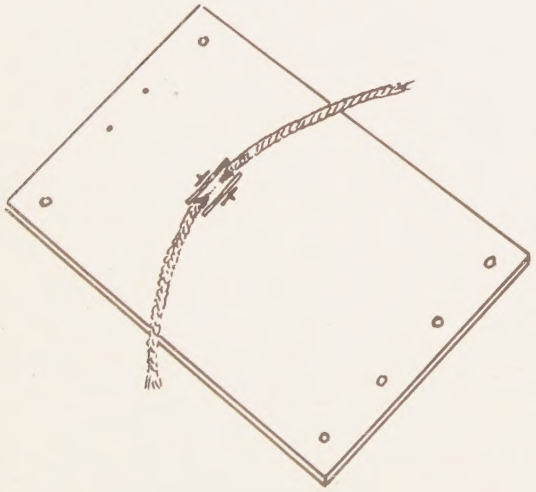
ALTERNATE HOOK UPS FOR KITE



1. Both kite arms shackled together over kite towing guide hole. Both towing wires are brought into this shackle.



2. Kite arms individually hooked into towing wires.



3. Continuous towing wire running through sheave placed over kite towing guide hole.

FIG. 5